



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/382,438	08/25/1999	WILLIAM R. GARDNER	QCPA990482	5232

23696 7590 07/03/2007
QUALCOMM INCORPORATED
5775 MOREHOUSE DR.
SAN DIEGO, CA 92121

EXAMINER

RYMAN, DANIEL J

ART UNIT	PAPER NUMBER
----------	--------------

2616

NOTIFICATION DATE	DELIVERY MODE
-------------------	---------------

07/03/2007

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

us-docketing@qualcomm.com
kascanla@qualcomm.com
nanm@qualcomm.com

Office Action Summary

Application No.

09/382,438

Applicant(s)

GARDNER ET AL.

Examiner

Daniel J. Ryman

Art Unit

2616

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Examiner acknowledges Applicant's filing of an RCE on 23 May 2007.
2. Applicant's arguments with respect to claims 10-30 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over van Nee (USPN 6,175,550), of record, in view of Hara et al. (Shinsuke Hara & Ramjee Prasad, *Overview of Multicarrier CDMA*, IEEE Comm. Mag., Dec. 1997, at 126), of record, in further view of Applicant's Admitted Prior Art in further view of Kuo (USPN 6,810,030), of record, in further view of Lundh et al. (USPN 6,804,214), of record.
5. Regarding claims 10, 17, and 20, van Nee discloses a method and apparatus in a wireless communication system, the method comprising the steps of and the apparatus comprising means for: designating a multi-carrier forward link having a plurality of forward link frequency bins (col. 2, lines 14-17, where "base stations transmit at all carriers simultaneously" implies the use of multiple carriers on the forward link, and where carriers are also known as "bins," see col. 1, lines 17-20); and designating a reverse link having at least one reverse link frequency bin (col. 2, lines 11-17, where "allocating only a fraction of the total number of carriers to each mobile"

Art Unit: 2616

implies the use of at least one reverse link carrier, and where carriers are also known as “bins,” see col. 1, lines 17-20), wherein the forward link frequency bins and the at least one reverse link frequency bin are designated such that bandwidth of the forward link is allocated differently from bandwidth of the reverse link (col. 2, lines 11-21 and col. 8, lines 40-67, where different data rates are allocated on the forward link as compared to the reverse link by allocating different numbers of carriers on the forward and reverse links).

Van Nee does not expressly disclose that the forward link frequency bins and the at least one reverse link frequency bin comprise signals obtained by code spreading. Rather van Nee discloses that the signals are transmitted using OFDM. Hara teaches that “in 1993, . . . three types of new multiple access schemes based on the combination of code division and OFDM techniques were proposed” (p. 126, 1st column), where “the combination of OFDM signaling and CDMA scheme has one major advantage that it can lower the symbol rate in each subcarrier so that a longer symbol duration makes it easier to quasi-synchronize the transmissions” (p. 127, 1st column). In each of these schemes, the frequency bins comprise signals obtained by code spreading (p. 127, 1st column, where one group of MC-CDMA, the frequency domain group, “spreads the original data stream using a given spreading code, and then modulates a different subcarrier with each chip,” while the other group of MC-CDMA, the time domain group, “spreads the serial-to-parallel (S/P) converted data streams using a given spreading code, and then modulates a different subcarrier with each of the data stream”). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have the forward link frequency bins and the at least one reverse link frequency bin of van Nee comprise signals obtained by code spreading, as outlined in Hara, since this results in a lower symbol rate in each

Art Unit: 2616

subcarrier so that a longer symbol duration makes it easier to quasi-synchronize the transmissions.

Van Nee does not expressly disclose that the code spreading occurs in the time domain. As outlined above, Hara discloses that MC-CDMA is divided into two groups, one which spreads in the time domain and the other which spreads in the frequency domain (p. 127, 1st column, where one group of MC-CDMA, the frequency domain group, “spreads the original data stream using a given spreading code, and then modulates a different subcarrier with each chip,” while the other group of MC-CDMA, the time domain group, “spreads the serial-to-parallel (S/P) converted data streams using a given spreading code, and then modulates a different subcarrier with each of the data stream”). Hara further discloses that frequency domain spreading MC-CDMA has problems maintaining orthogonality on its uplink channels (p. 131, 1st column, where “[m]ulti-user detection [MUD] techniques are necessary for the MC-CDMA uplink channel . . . , because the orthogonality among users is totally distorted) and in channels that experience selective fading (p. 129, 1st column, where “through a frequency selective fading channel, all the subcarriers have different amplitude levels and different phase shifts, . . . which results in the distortion of the orthogonality among users”). Thus, Hara suggests that MC-CDMA requires some sort of correction in the receiver (p. 131, 1st column, where Hara suggests using multi-user detection to correct for lack of orthogonality), where such correction is complex (e.g. p. 131, 1st column, where the only MUD technique disclosed that is applicable for both uplink and downlink channels has “complexity” that “grows exponentially as the number of users increases”). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to perform the code spreading in the time domain since code spreading in the

Art Unit: 2616

time domain occurs in the group of MC-CDMA that does not experience orthogonality problems, such that time-domain spreading MC-CDMA receivers are less complex than frequency-domain spreading MC-CDMA receivers.

Van Nee in view of Hara does not expressly disclose allocating each of the forward link bins and the at least one reverse link frequency bin for single-carrier CDMA communication within the respective bin. Applicant teaches as prior art that cdma2000 3X links are well known in the art since cdma2000 expands “the capabilities of the preceding technologies to include wireless e-mail, Web browsing, and corporate and local network access, as well as videoconferencing, e-commerce and multimedia” (page 4, lines 1-14). In addition, Applicant teaches that “[b]y using the 3X FDD mode and providing a forward link using the multi-carrier format, a communications system is fully compatible with existing IS-95 system” (pg. 5, lines 6-8). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to allocate each of the forward link bins and the at least one reverse link frequency bin for single-carrier CDMA communication within the respective bin in order to have a communications system that expands current technologies, but that is fully compatible with existing IS-95 system.

Van Nee in view of Hara in further view of Applicant’s admitted prior art does not expressly disclose that the designation of the reverse link is responsive to loading. Kuo teaches, in a multi-carrier CDMA system (col. 2, lines 59-63), allocating a reverse link in response to loading (col. 2, lines 25-30, where “[b]ased on carrier utilization [i.e. loading]/interference level, carrier assignments are allocated on an unequal basis,” see also col. 5, lines 61-64). Kuo does this “to achieve the goal of maximum utilization of potential capacity by equalizing the loading

Art Unit: 2616

and interference across the carriers” (col. 4, lines 24-28). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to designate a reverse link responsive to loading, as suggested by Kuo, in the system of Van Nee in view of Hara in further view of Applicant’s admitted prior art since this will maximize utilization of potential capacity by equalizing loading across the carriers.

Van Nee in view of Hara in further view of Applicant’s admitted prior art in further view of Kuo does not expressly disclose allocating the plurality of forward link frequency bins to carry different types of data. Lundh teaches, in a CDMA system using multiple carriers (col. 2, lines 61-63), allocating the plurality of forward link frequency bins to carry different types of data (col. 5, line 20-42, where the secondary carrier only carries power controlled data, such that data is allocated according to whether it is power controlled or non-power controlled). Lundh does this in order to reduce the total downlink power (col. 5, lines 28-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to allocate the plurality of forward link frequency bins of van Nee in view of Hara in further view of Applicant’s admitted prior art in further view of Kuo to carry different types of data, as outlined in Lundh, in order to reduce the total downlink power.

6. Regarding claims 11 and 21, van Nee in view of Hara in further view of Applicant’s admitted prior art in further view of Kuo in further view of Lundh discloses selecting a first forward link frequency bin from the plurality of forward link frequency bins for forward link transmission, the first forward link frequency bin having an associated first reverse link frequency bin (van Nee: col. 8, lines 20-40, where the base station communicates with a mobile over the forward link and the mobile units communicate with the base over reverse links, and

Art Unit: 2616

where, as broadly defined, a forward link used to communicate with a mobile unit and the reverse link used by that mobile unit to communicate with the base are “associated” since both links are tied to the same “conversation” between a base and mobile); and selecting a second reverse link frequency bin for reverse link transmission corresponding to the forward link transmission wherein the second reverse link frequency bin is different from the first reverse link frequency bin (col. 8, lines 20-47, where asymmetric data rates are accomplished by varying the carriers for the forward and reverse links, such that a single mobile has a plurality carriers on the reverse link).

7. Regarding claim 12, van Nee in view of Hara in further view of Applicant’s admitted prior art in further view of Kuo in further view of Lundh discloses that the selecting a second reverse link frequency bin is based on loading of the system (van Nee: where signal rates are increased until the point that system quality degrades, i.e. the system is loaded, col. 7, line 40- col. 8, line 1, and where rates are increased by adding further carriers, col. 8, lines 41-47).

8. Regarding claim 13, van Nee in view of Hara in further view of Applicant’s admitted prior art in further view of Kuo in further view of Lundh discloses selecting a third reverse link frequency bin for reverse link transmission corresponding to the forward link transmission, wherein the third reverse link frequency bin is different from the first and second reverse link frequency bins (col. 8, lines 20-47, where asymmetric data rates are accomplished by varying the carriers for the forward and reverse links, such that a single mobile has a plurality carriers on the reverse link, see e.g. col. 8, lines 20-27, where the mobiles transmit over 4 carriers).

Art Unit: 2616

9. Regarding claim 14, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh suggests that said plurality of forward link frequency bins comprise three frequency bins (Applicant: pg. 4, line 22-pg. 5, line 1).

10. Regarding claim 15, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh does not disclose in van Nee's main embodiment that the plurality of bins are adjacent frequency bins; however, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh does disclose in one embodiment that the plurality of bins are adjacent frequency bins (van Nee: Fig. 3; col. 6, lines 4-9; and col. 6, lines 47-59). Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to have said plurality of forward link frequency bins be adjacent frequency bins since this is disclosed in an embodiment in the system.

11. Regarding claim 16, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that said multi-carrier forward link is adapted for transmission of a plurality of code channels (Hara: p. 127, 1st column, where there are a plurality of coded channels). Van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh suggests that one of said plurality of code channels is used to communicate power control information for said second reverse link frequency bin (van Nee: col. 9, lines 9-16, where the base communicates power control information, and where, at outlined previously, communication between base and mobile occurs over coded channels, such that one of the plurality of coded channels would be used to communicate power control information for the second reverse link frequency bin).

Art Unit: 2616

12. Regarding claim 18, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses receiving by a first device a communication on a forward link frequency bin, the forward link frequency bin having an associated first reverse link frequency bin (van Nee: col. 8, lines 20-40, where the base station communicates with a mobile over the forward link and the mobile units communicate with the base over reverse links, and where, as broadly defined, a forward link used to communicate with a mobile unit and the reverse link used by that mobile unit to communicate with the base are "associated" since both links are tied to the same "conversation" between a base and mobile); and transmitting by a second device via a second reverse link frequency bin, wherein said second reverse link frequency bin is different from the first reverse link frequency bin (van Nee: col. 8, lines 20-30, where different mobile units communicate with the base station using different reverse link carriers).

13. Regarding claim 19, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh inherently discloses receiving by the first device an indication of a reverse link frequency bin (van Nee: col. 8, lines 20-67, where a base station and a mobile station must agree on a reverse link frequency bin in order to establish communication over a reverse link frequency bin).

14. Regarding claim 22, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that the designations of the forward and reverse link includes allocating more bandwidth for the forward link than the reverse link (van Nee: col. 8, lines 41-47, where an asymmetric link for "downloading data" implies that the forward link has a greater bandwidth than the reverse link).

Art Unit: 2616

15. Regarding claim 23, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that the designation of the forward link includes configuring the forward link as a cdma2000 3X forward link (Applicant: page 4, lines 1-page 6, line 8, where cdma2000 3X is a well-known CDMA multi-carrier system).

16. Regarding claim 24, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that the forward link includes first, second, and third carriers (Applicant: page 4, lines 1-page 6, line 8, where cdma2000 3X includes three carriers on the forward link).

17. Regarding claim 25, incorporating the rejection of claim 15, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that said first, second, and third carriers occupy first, second, and third adjacent frequency bins, respectively (van Nee: Fig. 3; col. 6, lines 4-9; and col. 6, lines 47-59, where the frequency bins are adjacent, and Applicant: page 4, lines 1-page 6, line 8, where there cdma2000 has three carriers).

18. Regarding claim 26, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh suggests that the designation of the reverse link includes configuring the reverse link as a cdma2000 1X reverse link. Van Nee discloses that the reverse link may be configured in a different manner than the forward link in order to support asymmetric data rates (van Nee: col. 8, lines 40-47). Applicant teaches as prior art that the 1X reverse link has a lower data rate compared to a 3X forward link (Applicant: page 4, lines 16-page 5, line 4). Therefore, it would have been obvious to one of ordinary skill in the

Art Unit: 2616

art at the time of the invention to have the designation of the reverse link include configuring the reverse link as a cdma2000 1X reverse link in order to have asymmetric data rates..

19. Regarding claim 27, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that the reverse link includes a fourth carrier (van Nee: col. 8, lines 20-30, where it is disclosed that a remote station transmits using four carriers).

20. Regarding claim 28, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh does not expressly disclose that the fourth carrier is located in a frequency range similar to the second frequency bin; however, Van Nee does disclose that the reverse link may be configured in a different manner than the forward link in order to support asymmetric data rates (van Nee: col. 8, lines 20-47). Applicant teaches as prior art having the reverse and forward frequency ranges overlap (Applicant: page 5, lines 12-28, where TDD allows a forward link and a reverse link to be communicated over the same frequency band). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to locate the fourth carrier in a frequency range similar to the second frequency bin, in order to permit the forward link and the reverse link to be communicated over the same frequency band.

21. Regarding claim 29, incorporating the rejection of claim 10, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses each limitation of claim 29, as outlined in the rejection of claim 10, except that a subset of the reverse link frequency bins are time-division-duplexed. Applicant admits as prior art that time division duplexing is well known in the art since it allows both the forward link and the

Art Unit: 2616

reverse link to be transmitted in a single band (page 5, lines 12-18). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have a subset of the reverse link frequency bins be time-division-duplexed in order to allow both the forward link and the reverse link to be transmitted in a single band.

22. Regarding claim 30, van Nee in view of Hara in further view of Applicant's admitted prior art in further view of Kuo in further view of Lundh discloses that the forward link data is allocated to each of the forward link frequency bins depending on a data type of the forward link data (Lundh: col. 5, line 20-42, where the secondary carrier only carries power controlled data, such that data is allocated according to whether it is power controlled or non-power controlled).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel J. Ryman whose telephone number is (571)272-3152. The examiner can normally be reached on Mon.-Fri. 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on (571)272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2616

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Daniel J. Ryman
Examiner
Art Unit 2616

Daniel Ryman